REPORT OF A CASE OF SARCOMA OF THE BASAL GANGLIA, MID-BRAIN AND PONS, WITH SECONDARY ASYMMETRICAL HYDROCEPHALUS.

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On Feb. 4th, 1897, an infant, nine weeks of age, with asymmetrical but well-developed hydrocephalus was admitted to the service of Dr. Reuel B. Kimball at the Babies' Hospital. The family history was entirely negative, the mother having eight other children, all of them healthy. The child was well nourished during the first few weeks of life, but soon ceased to nurse, and began rapidly to lose weight.

At the time of admission the child was 23½ inches in length, with a circumference chest measure of 13 inches. The head measured 21½ inches in circumference, 13½ inches from ear to ear, 16½ inches from nose to neck, and the right side of the head was very much larger than the left. The veins covering the head were markedly distended and tortuous. There was an interval of 3½ inches between the frontal bones at their upper part, and a separation of 2½ inches between the parietals. The child lay habitually in a position of pleurosthotonus, with the convexity to the right. There was constant rigidity in the extremities, the spasm being usually more pronounced in the arms than in the legs, and at times more marked on the right than on the left side. The pupils were small and responded feebly to light. Ophthalmoscopic examination by Dr. Arnold Knapp showed advanced atrophy of the optic nerves. The knee jerks were not obtainable.

The child was under observation in the hospital for two weeks. During this time the circumference of the head increased nearly one inch. In other respects there was little change in the conditions noted above. From time to time the child uttered shrill cries. There was some disturbance of intestinal digestion, and occasional vomiting. At the time of death the child was nine weeks old. It is said that the head did not begin to enlarge until the child was three weeks of age. The enlargement of the head was thus very rapid.

Eighty-two hours post-mortem. Body—weight, 14 lbs. 2½ oz. No skin lesions; poorly nourished. Some edema of feet and ankles. Rigor mortis fairly well marked. Brain—1300 c.c. of fluid removed. On removal of dura, convolutions everywhere very much flattened; pia normal in appearance; very little fluid between dura and pia; ventricles enormously distended with fluid.

Brain substance considerably softer than normal.

Occipital lobe, inferior surface; brain substance ½ c.m. thick, tempero-sphenoidal, inferior surface 3 m.m., frontal lobe, inferior surface 2 m.m. Ependyma everywhere perfectly smooth, slightly reddened in places and covered by a considerable number of small radiating vessels, a little more prominent than normal. The distance between the outer borders of optic thalami measures 8½ c.m. From anterior border of cerebellum to anterior extremity of corpus striatum, 7 c.m. on either side. On either side of basal ganglia apparently some induration and infiltration of the adjacent white matter.

Base—Optic chiasm is wholly indistinguishable, optic nerves very much thickened, and the entire central basal region protrudes downward and appears to be extensively infiltrated and enlarged. Pia covering peduncles apparently thickened. Coronal sections through the basal region, beginning with the anterior extremities of the thalami, indicate an infiltration of the entire central basal region with grayish material of rather firm consistence in places, in other places of rather gelatinous consistence.

A coronal section, 1 c.m., anterior to posterior end of pulvinar of thalamus, shows the third ventricle to have a transverse diameter of 1½ c.m. and the same vertical diameter, the canal grows rapidly smaller from this point forward and is entirely obliterated by the tumor at a point about 1½ c.m. anterior to level just mentioned.

Section at level of posterior end of pulvinar—Canal is blocked; there is infiltration and increase in consistence; indications of third nerve visible; fibres of third nerve, as they course from nucleus downward to point of exit, are more widely separted than normal; they are also more irregular in their course.

Section through pons—Near its upper border showed indications of same blocking of central canal. Entire pons on section infiltrated and much enlarged.

Measurements of pons—Vertically, 2 c.m., 8 m.m.; transversely, 2 c.m., 2 m.m. Central canal blocked, topography of pons only dimly recognizable owing to infiltration.

Floor of fourth ventricle presents a grayish appearance, especially in its lower half; the striæ acusticæ are visible, but not so distinct as normal, and the various contours corresponding to the cranial nerve nuclei are partially obliterated.

Anterior surface of pons retains its contour; pyramids are about normal in shape, but larger than they should be. Just below the calamus scriptorius upon the left side of the left restiform body is a small translucent mass about the size of a split pea.

Medulla is increased from side to side, apparently infiltrated by a gelatinous substance which extends ½ c.m. into adjacent substance of the cervical cord.

Spinal cord.— In cervical region transverse maximum diameter of 12 m.m., anteroposteriorly, 6 m.m. The two lateral halves of cord are symmetrical. There appears to be a small fissure, about 1 m.m. in length, in right posterior horn in upper cervical region. In dorsal region there is a wide fissure about 3 c.m. in length, extending into anterior surface of cord in median line; on either side of this, in the anterior horns, runs a vertical cavity about 1 m.m. in diameter.

Right Eye.—About the papilla are numerous small, irregular, sometimes oblong patches of pinkish tint, apparently disposed more or less radially to papilla. Left Eye.—Conditions less marked. Lungs—No pleurisy; right lung, posterior portion of upper and middle lobes consolidated; lower lobe solid. Left lung, lower surface of upper lobe shows strips of consolidation; lower lobe consolidated; on section, red broncho-pneumonia.

Bronchial lymph nodes normal.

Heart—Normal; foramen ovale closed.

Liver—Somewhat fatty. 5 oz. 1½ dr.

Spleen—Normal. 3 dr.

Pancreas—Normal.

Kidneys—Normal. 1 oz. 3 dr.

Suprarenals—Normal.

Stomach—Normal.

Intestine—Ileum and jejunum normal.

Colon—Solitary follicles enlarged.

Mesenteric lymph-nodes—Normal.

Culture—(on glycerine agar) from hydrocephalic fluid showed bacillus coli communis (probably post-mortem contamination).

Microscopic Diagnosis:—Spindle-celled sarcoma of the basal region of the brain with small metastatic tumor near restiform body. Double optic atrophy. Broncho-pneumonia with purulent infiltration. Fatty liver. Parenchymatous degeneration of kidneys.

Microscopical examination. Tumor at base:—Coronal sections through mid-brain, beginning anteriorly, show infiltration of the substance with large spindle cells which have very granular nuclei; scattered among these cells are found also some small and some large round cells.

Spindle cells lie side by side forming strands which run in every direction, forming in some areas a feltwork in the meshes of which are groups of spindle and round cells.

In some areas the cells are closely packed giving the stroma a dense appearance; in other areas the meshwork of cells is looser.

Stroma moderately vascular. Sections through middle and posterior portions of tumor show gradually decreasing infiltration of the brain substance.

Sections including portions of the margin of the circular aperture in centre of tumor mass, whose gross appearance gave indications of being the dilated third ventricle, show this margin to have a ragged edge; no indication of inflammation found; in one place well-preserved columnar epithelial cells are visible for some distance; they are evidently the epithelial cells of the ependyma.

Sections stained with picro-acid fuchsine show more distinctly than those stained with eosin and hæmatoxylin, what appears to be an intimate connection between the adventitia of the blood vessels at one point and the most densely infiltrated portion of the tissue at another; fine strands composed of spindle cells run from the vessels for a considerable distance, finally appearing to blend with the cells of the most markedly infiltrated areas.

Pons—Much less infiltration of the substance with spindle-shaped and round cells. Central canal considerably dilated; epithelial lining well preserved. Outlines of ganglion cells indistinct; nuclei pale.

Medulla—No infiltration of substance; nerve cells better preserved than those in pons. Portion of choroid plexus included in section, shows grouped about one or two of the larger blood vessels aggregations of spindle cells which appear here as above to spring from the adventitia. The small metastatic tumor external to left restiform body shows same structure as stroma of large tumor at base, save that the structure is quite loose, cells being separated from each other as though by fluid (gross appearance was one of translucency).

In several places the fibres of the pia seem to be growing into stroma of the tumor.

Cervical enlargement—A breaking down of gray substance in both anterior horns to form small cavities; canal patent; epithelial lining intact.

Mid-cervical region—Anterior fissure wider than normal; passing downward it increases in breadth, and in dorsal region it gapes widely.

Cavities in anterior horns exist until mid-dorsal region is reached, where they cease. In lower dorsal region a deep fissure is seen, extending from anterior surface of cord through right anterior column to a point nearly on a level with the spinal canal; canal in this region contains granular material.

Optic nerves show advanced atrophy of the nerve fibres.

Lungs—Epithelial lining of bronchi almost completely destroyed; many bronchi clogged with pus cells and desquamating epithelial cells. Walls of bronchi are intensely vascular and infiltrated in many places with small round cells. Alveolar walls show thickening, and their capillaries are much congested; contents of alveoli; desquamated respiratory epithelium; pus cells and pigment-carrying leucocytes; this pigment is deposited also in the interstitial connective tissue. Some of the broncho-pneumonic areas show very marked purulent infiltration.

Liver—Shows advanced stage of fatty degeneration; most of the parenchyma cells converted into fat, but here and there are small groups of epithelial cells fairly well preserved, with palely staining nuclei.

Spleen—Some distention of the cavernous veins.

Pancreas—Normal.

Suprarenals—In places fatty degeneration of the epithelial cells of the cortex.

Kidneys—Granular degeneration of the epithelial lining of the secreting tubes. Contents, fibrin and cell fragments. Loops—Epithelium shows slight degeneration.

Collecting tubes—Epithelial cells swollen, nuclei pale, in few places cells breaking down. Vessels—Normal. Tufts—Capsules normal, except in one or two places where they partake of a degenerative change described below. Epithelium of capsule swollen and desquamating. Capillaries congested; tufts in most instances completely fill capsules. In several places the tufts show a degeneration somewhat resembling amyloid change; the degenerated material is homogeneous in appearance, staining well with eosin, and gradually replacing the tuft. In a few instances Bowman's capsule is involved in this degenerative change.

Besides the very rapid increase in the size of the head, which was noted in this case, the hydrocephalus bore the exceptional character of being much more developed upon one side than upon the other. In observations relating to many cases of hydrocephalus in children, I have never met with a degree of assymmetry equal to that noted here, and Dr. Holt, whose experience is larger, was equally impressed with the exceptional degree of asymmetry. Dr. Peterson, however, tells me that he has once or twice observed a marked inequality of the head in cases of apparently primary hydrocephalus.

In a case reported by Demme, the enlargement of the head, which became great, was apparently confined to the right half of the head and was noticeable at birth. Here there is no reason to suppose that the hydrocephalus was secondary to a new growth, for focal symptoms were absent, the optic papillæ were normal, and the child was still under observation when nearly four years of age, when the intelligence was good and considerable language had been acquired. The evidence thus favors the view that a primary hydrocephalus may not merely present marked asymmetry, but may be in very rare instances strictly unilateral. I am quite unable to think of a satisfactory explanation of the manner in which such cases arise.

In the present case the asymmetry of the hydrocephalus appears to depend upon the mechanical influence of the neoplasm and its most reasonable explanation seems to be that the communication of the right ventricle with the ventricular system, through the foramen of Munro, was blocked at an earlier period than the corresponding communication of the left ventricle, both foramina having been eventually blocked by the infiltration of the new growth.

Microscopically the new growth presents nothing of interest except the relation of certain cells to the blood vessels, which makes it likely that the neoplasm had its origin in the connective tissue of certain vessels of the optic thalami, and that it arose from several foci at about the same period rather than from a single focus.

The appearances described as relating to the spinal cord impress me as artefacts.

In looking through the literature relating to rapidly growing sarcomata of the basal region of the brain in infants, I have not been able to find cases which bear a sufficiently close relation to the present case to make a comparative study of much interest.

I wish to express my indebtedness to Dr. Louise Cordes for aid in the preparation of the pathological report.

Dr. Angell:—I was very much interested in Dr. Herter's case because I have had a similar, though by no means so marked a case. In my patient the hydrocephalus was secondary to the pressure caused by the tumor, which was a cerebellar growth. We have not, fortunately for the child, succeeded in getting a necropsy, because the child still lives. While the enlargement of the head was not very great—I think the greatest circumference of the head of the child, at five years of age, was twenty-two inches—the side on which the growth was situated was decidedly larger. I do not think Dr. Mills, who saw the child later, nor I, advanced any theory to account for this. In this case we did succeed in getting a quiescent state of the growth under the influence of iodide of potassium and cod liver oil, although there was no specific hereditary history. The child now walks with the aid of a little chair, and there is some improvement in his mental condition.

Dr. Edward D. Fisher:—The cases Dr. Zenner has reported are of very great interest in that they show irregular types of brain tumor. Two or three cases have been under my own observation in which the usual symptoms of brain tumor have not been present; that is, cases in which the paralysis has not been marked, even although, as we found at the autopsy, the motor areas have been compressed. There has also been an absence of optic neuritis in these cases, and on the presence of this sign we naturally count a great deal in forming the diagnosis of tumor.

Dr. Zenner's statement, in reference to the relief observed in many cases from operation without removal of the tumor, I think is correct, and it is not necessary that we should operate at the site of the tumor to obtain this relief. A patient under my observation illustrated this point very well. In this case the tumor was found at the necropsy to be connected with the cerebellum. The operation had been done over the forehead and had given complete relief for three months, until the death of the patient from other causes. The convulsions with which the patient had been afflicted had entirely ceased. I have not always found percussion of the skull of great value in the localization of a tumor. It seems to me to be of service at times, but is not to be relied on, and is only an aid in forming a diagnosis.

In the slowly-growing tumors we find that the displacement in the motor areas is often so gradual as not to result in paralysis. I have seen this condition lately in two cases, in each of which a very large tumor was present, affecting the motor area of the brain and causing localized epileptic convulsions. In one of these cases also there had been no optic neuritis, and yet the localizing symptom of an epileptic seizure had been distinct. There was a very large tumor, about two and a half by three and a half inches, involving the motor areas.

In another case, which did not come to operation, a tumor was found at the autopsy depressing and distorting the pons. Paralysis had been noted on the same side as the tumor. Whether or not that will turn out later to be a case of the sort Dr. Zenner referred to, in which the pyramidal tracts do not cross, I do not know.

There are many cases of tumor which cause very few symptoms and last a long time, and the forming of a diagnosis in these cases, except from the general symptoms, is very difficult.

Dr. Pershing:—A man of middle age had general convulsions and loss of consciousness about two years before he consulted me. Since that time he had noticed a defect in vision, particularly while reading, and had found it difficult to follow the lines. There had been occasional attacks of convulsions, but almost no headache. Examination revealed a sharply defined quadrant hemianopsia, the upper quadrant of the right sides being missing in both fields. The optic discs were perfectly normal.

The apparently sudden onset led to a diagnosis of vascular occlusion, and the quadrant hemianopsia was attributed to softening in the region of the calcarine fissure.

After a time the patient grew rapidly worse. Headache then came on and was severe. The right side became paretic. Word-deafness and paraphasia were noted. The patient at one time asked his wife to put some ice-water on the fire. Within two weeks after the development of these symptoms he became comatose and died. There was no optic neuritis at any time. At the necropsy a firm tumor, about the size of a hen's egg, was found in the left temporo-sphenoidal lobe. Around this tumor, especially in the thalamus and crus, was a soft, infiltrating growth, which was evidently a glioma. The macroscopic appearance of the occipital cortex was perfectly normal. The hemianopsia must have been caused by disease of the pulvinar.

Dr. Langdon:—A case seen recently by me bears on the favorable results of operation referred to by Dr. Zenner. A man of fifty had stupor, right hemiparesis, paraphasia, right hemianopsia, subnormal rectal temperature for ten days, which only twice went slightly above normal, and a pulse of forty-five to forty-eight. It was finally decided to explore posteriorly to the left motor area. At the operation nothing was found but an anemic condition of the cortex. No pus was revealed by probing. Within forty-eight hours the man's mental condition improved, his pulse went from forty-five to sixty, his temperature rose to 98.4-99, and was not again subnormal. His improvement still continues, although the right motor paralysis is now absolute.

[Note.—June 16th—A necropsy obtained since the above remarks were made revealed an inflammatory mass (gumma?) subcortically situated in the left angular gyrus, and also extensive discoloration of the adjacent white matter. The angular gyrus was necrotic.]

A case observed by me in which the symptoms and the location of the growth indicated a non-decussation of the pyramids, was published in full in Brain in 1895. In this case the symptoms had existed for seven years. There had been double optic neuritis and all the evidences of an intracranial growth, which I was inclined to locate in the pons on the right side above the decussation of the pyramids. At the autopsy, however, the tumor was found on the left side, involving the pons and cerebellum above the motor decussation, and the pyramidal decussation was absolutely perfect. The motor and sensory weakness, however, had been on the same side as the tumor. The specimen was shown before the Neurological Society of London and caused considerable discussion. Two or three explanations were offered for the location of the growth on the same side as the symptoms.

Dr. Fry:—I recently saw a necropsy in which a diagnosis of tumor of the cerebellum was confirmed. There was marked asymmetry of the skull. One lateral ventricle was more distended than the other. The foramen of Monro was open.

During life there had been a decided difference in the percussion note of the two sides of the skull. The percussion sound in this case, and in two other children with distended skulls from tumors of the cerebellum, has recently interested me. In all the cases percussion gave a peculiar cracked-pot sound, due, I suppose, to the wide separation of the bones at the sutures. I have not examined the literature sufficiently to see what has been said about this sound by others.

Dr. Hugh T. Patrick, of Chicago:—It seems to me that by far the majority of the cases of tumor we see are of the irregular type; each case of tumor has to be decided for itself on its own merits. I think that Dr. Zenner's former belief regarding the general convulsion preceding the local convulsion in deep-seated tumors, is correct. I have come to that conclusion, partly from experience, partly from reading a few reported cases, and, I suppose, partly from reasoning. I have been accustomed to be guided by this sign in questions regarding operations, of course with exceptions; and I have even been guilty of teaching this opinion.

I should like Dr. Zenner to speak a little more definitely. He says he found exceptions. I should like to know whether they were not really exceptions, and whether the rule does not hold good, and hence is really of value in diagnosticating. I think it is, and that the primary convulsion in the deeply-seated tumors, which start within and grow toward the cortex, is apt to be general and the others local, possibly with general convulsions.

As to the incision in the brain, I feel inclined to advise it; always with due respect to the surgeon and his technique. If the operation is begun for tumor, and if we feel reasonably certain that it is there, it seems to me that the proper thing is to keep on cutting after the surface of the brain is reached, because we do have these typical symptoms from the subcortical as well as from the cortical growths. If we have sufficient symptoms indicating a focal origin, I believe, ever with deference to the judgment of the surgeon, that it is proper to go below the surface for the tumor, if it is not found on the surface.

As to Dr. Pershing's remarks, I think that the careful examination of the visual fields, and the careful examination for speech defects, are often of assistance in making a diagnosis and in localizing the tumor. These symptoms are sometimes searched for too superficially. Slight defects of speech are sometimes of real diagnostic assistance in the early period of growth of brain tumors.

Dr. W. M. Leszynsky:—I saw a patient recently in whom there were symptoms of cerebral abscess complicating middle ear disease. Trephining over the temporo-sphenoidal lobe was performed and the parts fruitlessly explored. Within a few days the optic neuritis subsided and there was considerable improvement in the symptoms. The patient died, however, on the sixth day.

The President:—I have seen seven cases of brain tumor since the last meeting of the Society, four of which were operated on and the other three of which came to autopsy. I have seen in all, if you will grant my diagnosis, fifteen other cases; but these seven I know were tumor, because I saw the tumor. The percussion note was distinctly altered on the side of the tumor in three, and in the other four it was not.

In the first case, operated on by Dr. Weir, the tumor, a small infiltrating gliosarcoma, was found at the autopsy lying in the white matter of the apex of the temporal lobe on the left side. It was about an inch in diameter in all directions and quite vascular. For three months before the operation there had been a progressive motor aphasia, attended by paralysis, first of the right side of the face and then of the right arm; and (while the patient was in the hospital) of the right leg. The progression of symptoms is interesting. The aphasia was the first symptom—purely motor, not sensory; then there were twitchings of the right side of the face; then of the right arm; then paralysis of the right side of the face; then paralysis of the right arm; then complete hemiplegia. There were optic neuritis and also headache, but no general convulsions. It seemed perfectly clear that the tumor must be in Broca's centre. At the operation nothing was found, excepting a distended hemisphere, and no palpable tumor anywhere. Of course, there was no relief, excepting from the headache, and death occurred about ten days after the operation. This tumor was found at the necropsy with some difficulty, because the necropsy was made through the small opening of the skull, and the tumor lay at some distance below the portion of the brain exposed.

In the second case the patient was seen at the clinic, and had been under observation for about two months before we decided to operate. The general symptoms were very marked; they were optic neuritis, headache, percussion note very markedly different, great tenderness of the skull, and very slight hemiplegia. There were a number of general convulsions, and then the patient had a typical unilateral convulsion limited to the right side. We took that, of course, as the indication, and although she was in quite a comfortable condition and easily able to walk around the ward of the hospital the day she was operated on, yet we thought, inasmuch as the blindness was very marked, we had better operate. At the operation by Dr. McBurney we were much astonished, on exposing the motor area of the cortex, to find an enormous infiltrating gliosarcoma measuring three and a half inches in one direction and two inches in the other, occupying the entire motor area of the brain—and yet the woman had walked around the ward as well as possible. The removal of the tumor was attended by enormous hemorrhage, and the day following the woman went into collapse and died.

The third case was that of a patient with all the symptoms of a brain tumor, which was easily located in the cerebellar fossa. Optic neuritis, vomiting and other symptoms were quite well marked, and the cerebellar staggering was characteristic. Nothing had been retained in the stomach for three weeks; the agony from the headache was awful; the man was nearly blind and insisted on something being done. Dr. McCosh operated, although we stated to the family that there was very little hope. The operation was done over the cerebellum, on the side on which it was pretty evident from cranial nerve affection that the tumor lay. The cerebellum was well exposed and appeared to be perfectly normal. The operation was, of course, a disappointment. Dr. McCosh thought something further ought to be done in the way of exploration, and he enlarged the opening upward in the hope that the tumor might be found. Not finding it there, he tapped the lateral ventricle, and we obtained immediately forty cubic centimetres of fluid. At the end of the tapping a drainage tube was placed in the ventricle and the patient removed to bed. The headache and vomiting immediately ceased. The man began to recover, and was very comfortable for the next two weeks, being entirely free from the general symptoms of brain tumor; viz.: headache, vomiting and general restlessness. There was marked relief of the general symptoms by this tapping of the ventricle. At the necropsy the tumor was found in the cerebellum, exactly under the place we had exposed, but it was covered by a perfectly normal layer of cerebellum. We could not have found the tumor during life; even at the necropsy it was difficult to distinguish its limits.

The fourth was the case of a little girl with symptoms of cerebellar tumor. These had come on very rapidly during three months, and then were absolutely stationary for about seven months. She was brought to my clinic. The child was totally blind and had headache and was unable to walk. We decided to operate and Dr. McCosh made the attempt. Our intention was to expose the cerebellum on the left side, because the cranial nerve symptoms were greater on the left side, and a flap of the skull was turned down, exposing the occipital bone. This was found to be full of small holes, through which the venous blood gushed. It was impossible to operate any further without causing death on the table. Dr. Walton, of Boston, has reported one case of a similar condition, where apparently an erosion of the occipital bone had occurred. It seemed to me that this tumor had gone on producing symptoms during the first three months; had eroded the occipital bone; then that a collateral circulation had been established between the inside of the skull and the scalp, through these holes in the bone, and that this was the reason why there was relief in the symptoms which had become stationary for seven months.

I am impressed with the fact that so many of our symptoms of brain tumor are due to effusion into the lateral ventricles, and if that does not occur we are misled as to our diagnosis.

In another case, the man had most irregular symptoms, very largely of the mental type, occasionally attacks of hemiplegia, lasting for a few hours and then passing off entirely, also attacks of coma coming on gradually and passing off gradually. At the necropsy an enormous tumor was found in the right temporosphenoidal lobe, involving also the basal ganglia. There was little or no effusion into the ventricles, and the general symptoms in this case were few and slight.

As to asymmetry in hydrocephalus, I have never seen it. I reported to this Society seven years ago a tumor which looked very much like the tumor which Dr. Herter has reported, and photographs of that can be found in my article in Dercum's Text Book on Nervous Diseases.

Dr. Herter:—An interesting question is whether we are to regard a marked degree of asymmetry in hydrocephalus as being presumptive evidence that we have to deal with tumor. From what Dr. Peterson has told me I should judge that this is not the case, and I should judge also from the case of tumor that I referred to this morning, that this is not the case. At the same time it may be that most cases of hydrocephalus that present a high degree of asymmetry are due to tumor. If that is so, it is a point of interest in helping us to make a dagnosis in these cases. I judge that these cases of asymmetry are comparatively rare. In the literature I have come across several cases which resemble the one referred to here this morning, in which there was a tumor of the cerebellum, and in which there was a certain degree of asymmetry in the hydrocephalus.

Dr. Zenner:—In regard to the diagnosis of cortical and subcortical tumors, Dr. Patrick spoke of the character of the first attack. It is difficult to find many cases that directly point to this issue. There are cases of subcortical tumor where, according to the report, the first attack was of a Jacksonian type, and other cases where the first attack was of a general character. The same is true of cortical tumors. I had merely given up that point as of no value, although I thought subsequently that it is just possible that the reports have not been accurate in this respect. The case reported by the President is also against the view. I should have been glad to have heard more about the value of percussion of the skull in forming the diagnosis.

Another point was mentioned by Dr. Fisher. I saw a case a few days ago in which I suspected the existence of a tumor on account of the symptoms, the chief motor manifestations being slight ataxic movements of the right hand. I saw a case of that kind once before, where I did not have an opportunity to see the necropsy, but in which the existence of a tumor was undoubted. The question is in regard to the localizing significance of such ataxia.

The President:—As to percussion note, I have been percussing all the heads that I could get hold of for the last two years, and I think that it is not a reliable symptom. I do not think we can put a very large diagnostic value upon it at present. That is the reason why I mentioned that out of seven cases of tumor, the percussion note was changed on the side of the tumor in three, and not changed in the other four. I can add to that five cases of abscess of the brain, observed at the New York Eye Infirmary, and the percussion note was changed on the side of the abscess in three and not changed in two. It is a symptom that is irregular. As to the location of the tumor being cortical or subcortical, I do not think it affords any indication whatever. The change of percussion note is not indicative of cortical as distinguished from subcortical tumor.

As to ataxia, I have not found it at all common as a symptom in tumors, and I have been very much surprised that this is so. I have observed two cases, however, that are of interest, in which there was no ataxia prior to the operation, but in which a very marked ataxia of the hand developed subsequently to operation on the posterior central convolution. An angioma was removed by Dr. McCosh from the posterior central convolution of a boy who, although perfectly able to move before the operation, yet for three weeks after the operation was extremely ataxic, so much so that he could not feed himself with his right hand. I had the same experience this year in a case of epilepsy. A cyst was found and removed by Dr. McBurney. Subsequently to removal of that cyst an ataxic condition developed. After three weeks the symptom passed off. I have not seen it as a permanent symptom in tumors.

Dr. Joseph Collins and Dr. G. E. Brewer read by title a paper on the

REMOVAL OF PART OF A SUBCORTICAL CEREBELLAR TUMOR; DEATH TWO AND ONE-HALF MONTHS LATER.

The symptoms in the case were severe headache of acute development, and at first located chiefly in the back part of the head, dizziness, vomiting, uncertain gait, with a tendency to go toward the left, slight uncertainty in the movements of the upper extremities, loss of the knee-jerks at a later stage of the disease, and choked discs, more marked on the left side and developing rather late in the process. There were no symptoms of sensory nor motor palsy, and the gait was not typically cerebellar in type, but rather that of asthenia. The patient, in an advanced stage of the disease, was unable to stand. On account of the absence of any symptoms other than the classical ones of cerebellar tumor, a subcortical growth in the substance of the right cerebellar hemisphere was suspected.

An omega-shaped incision was made, with the convexity upward, beginning in the median line opposite the rudimentary spine of the first cervical vertebra, extending upward and to the left, then arching over and toward the right mastoid process, then downward to a point about two inches to the right of the point of the original incision. Nothing abnormal was seen in the right half of the cerebellum, and an incision half an inch in depth was made into the cerebellar tissue. As nothing pathologic was found, a second and deeper incision was made near the median lobe, and the finger, at the depth of one and one-half inches below the surface, came in contact with a distinct nodule, about three-fourths of an inch in diameter. This was removed. The patient rallied and gained thirty pounds of flesh.

About two months after this operation it was thought best to re-open the skull on account of a return of the symptoms. Lumbar puncture was first performed. The patient died during the operation. A large tumor was found at the necropsy in the right cerebellar hemisphere, and proved on examination to be a typical caseous tuberculoma. Evidences of tuberculosis were found in other parts of the body.

(To be continued)